

the Weierstrassian function-theory upon other branches of analysis, and in particular upon the problems of celestial mechanics, is truly remarkable.

It is to be hoped that the publication of Prof. Forsyth's work will make English mathematicians better acquainted with current research on the subjects with which he deals. The value of his treatise for really competent readers is evident, and needs no commendation. But we may, perhaps, regret that he has not more definitely considered the interests of the rising generation. It is most important that new ideas and recent methods should be introduced to young men of ability while their minds are keen and susceptible; and their interest is seldom aroused in the first instance by a treatise which aims at being exhaustive. To take an example in point; few readers, we imagine, to whom the subject was new, would persevere in the study of Lie's great work on transformation-groups; yet what mathematical student could fail to be delighted with his lectures on differential equations with known infinitesimal transformations, as edited by Dr. Scheffers?

No doubt the task of writing an introductory, and thoroughly didactic, treatise on the modern aspects of this theory is very difficult; more so, very likely, than the one to which Prof. Forsyth has applied himself. The selection, combination and assimilation required would demand a great deal of care and judgment; a certain lightness of touch would also be desirable, and this is not easy to maintain after a course of reading in the extremely ponderous memoirs which are so often found in the literature of the subject. But a work of this kind might do more than the most conscientious handbook to encourage a living interest in the theory of differential equations. There is some appearance of a tendency to over-elaboration in English treatises presumably written for students; to authors as well as to lecturers may be commended the maxim "Above all, do not be dull."

G. B. M.

OUR BOOK SHELF.

Origin and Character of the British People. By Nottidge Charles Macnamara. Pp. 242; 33 figures. (London: Smith, Elder and Co., 1900.)

MR. MACNAMARA seeks, in a small compass, to indicate the origin of the component parts of the British people, and to account for the differences of local moral character by proportionate inheritance from the original races, all of which are assumed to have their mental and moral peculiarities as fixed as their physical characters. He believes that the Iberians, as he prefers to call the Mediterranean or Afro-European race, formed the primary stock from which the existing inhabitants of Great Britain and the West of Europe are derived; and that they are the modified descendants of Palæolithic man. The tall fair Aryans originated in Western Asia.

The pioneer migration of the Aryans into Europe formed the Cro-Magnon race; then came the dolmen-builders, the South Mediterranean branch extending from the Amorites to the "fair Libyans"; the migrants into Central Europe mixed with the brachycephals and constituted the "Celts." A distinct northern migration formed the Teutonic Aryans.

The author also believes that dolmens and long barrows are everywhere the work of the Aryan race. The pre-

historic tall brachycephals of Northern Europe were a branch of the Northern Mongolian or Turanian race. The short dark brachycephals of Central Europe brought the art of working in bronze from Asia, presumably from Burmah. The Formorians of Ireland were Iberians; in North-west Ireland are still to be found descendants of the Northern Mongoloid race; the Firbolgs were Celtic Aryans or dolmen-builders. The Southern Mongoloids arrived in the bronze age; these are the Tuatha de Danann. A second invasion of Aryan Celts, or Milesians, arrived in Ireland also during the bronze age. This abstract gives a fair idea of the scope and views of the author.

The Geography of the Region about Devil's Lake and the Dalles of the Wisconsin. By Prof. R. D. Salisbury and Mr. W. W. Atwood. Pp. x+151. (Madison, Wisconsin: Geological and Natural History Survey, 1900.)

THIS is the first number of an "Educational Series" to be published by the Wisconsin Geological and Natural History Survey. The region to which attention is now particularly called is in the south-central part of Wisconsin, and it is of interest because it well illustrates many points in the geographical evolution of land-surfaces. It comprises an undulating plain chiefly of Potsdam Sandstone, with some areas of magnesian limestone, and with a northern and southern range of bold quartzite hills. The southern range rises from 500 to 800 feet above the surrounding land, or up to 1600 feet above sea-level, and in the bottom of a deep gap, which divides this range, lies Devil's Lake. This is a lake which, in glacial times, occupied an enclosure between the ice on the one hand and the quartzite ridge on the other: a gorge which originally was the work of a pre-Cambrian stream. The melting of the ice supplied abundant water, and the lake rose perhaps 90 feet above its present level. In this and in many other cases the irregular deposition of glacial drift gave rise to many depressions without outlets, in which surface-waters collected after the ice had disappeared. Few of these lakes now remain in the region, but Devil's Lake, which is more than a mile in length and half a mile wide, occupies an unfilled portion of an old river valley, isolated by great morainic dams from its surface-continuations on either hand. Streams originate beyond these dams. The "Dalles" are sandstone cliffs which form a gorge along the Wisconsin River for a length of about seven miles, and a depth of 50 to 100 feet. The effects of weathering by atmospheric agents, and of erosion by the river, are well exhibited, and the views remind us of the rock-scenery along the Eden near Corby Castle.

The volume, which, with its index, extends to 151 pages, is in reality an essay on the origin of scenery treated from a geological point of view. The authors deal with the pre-Cambrian history of the quartzite, from its origin in loose sand to its uplift and deformation; and they deal similarly with the other strata. They contribute also a fairly full account of the phenomena of the Glacial period, and of the work of rain and rivers. Numerous excellent photographic representations of the scenery are given, including views of various natural arches, tors, and needles.

Monistische Gottes- und Weltanschauung. Von J. Sack. Pp. viii + 278. (Leipzig: Engelmann, 1899.)

IN Herr Sack's view all particular existences are modes of one spirit-substance—God. He calls this doctrine monism, and not pantheism, because he thinks the latter not incompatible with polytheism. Be this as it may, the distinguishing mark of his thesis is that it works to an Hegelian doctrine of being along the lines of a naturalistic theory of becoming that might satisfy Mr.

Spencer. The result is a form of vitalism. The movement which is to be found in the inorganic world is not merely continuous with, but synonymous with life and consciousness. Matter is not only the revelation of spirit, but body and spirit are one and the same. His method, which consists simply in the assumption that human spirit is an *analogon* of the world-principle, will not bear this conclusion. And his superstructure is rather in the air.

In his view of evolution there is nothing novel. It is, of course, teleological. Its real dynamic, as opposed to its formal occasions, is the all-inclusive being as principle of organisation. The working of this is elucidated quite after the manner of Mr. Spencer, by what Herr Sack oddly calls "antinomies"—viz. the antithesis of individuality and community, and the like.

It is when, he comes to deal with art, morals and religion that Herr Sack is most at home. These are man's adumbrations of the contents of the intellectual intuition of the universal spirit: Art, like ethics, is a social product. Ethics are treated in a manner on the whole definitely Spencerian, even to the condemnation of the social-democratic movement. In his discussion of religion, Herr Sack is opposed to Mr. Spencer, and, while owing a good deal to Prof. Max Müller, is original. Not in dreams with their presentment of the dead, not in natural phenomena like sunrise and sunset, not in anything so symbolic as totemism, does the matter of religion arise. They might confirm its sublimity; they are most of them too habitual and ordinary phenomena to create it. It is rather what suggests the invisible, the beyond, the infinite, that originates religious feeling—the horizon, the movement of the wind, the breath of life. Infinite space and infinite movement, and the *anima mundi*, are the elements of the religion of monism, and primitive religion was monistic. Cult degrades it into polytheism, and an interested priestcraft corrupts it; but monism has never been without a witness.

A world of spirits, in the spiritualist's sense, is of course incompatible with such a view. As is individual immortality. In truth, personality other than relative can belong only to the *Allwesen*, "in whom we live, and move and have our being."

In description, Herr Sack often shows a good deal of power. His views in the field of *Religionsforschung* doubtless express something of the truth, though not to the exclusion of other explanations. Indeed, the horizon, and the wind, and breathing are habitual too! Herr Sack's monistic formula, if true, must be established on other lines than his. Its only value here is that of any unverified vaticination that has brought peace to some of our fellow-men.

H. W. B.

First Stage Hygiene. By Robert A. Lyster, B.Sc.Lond. Pp. viii + 199. (London: W. B. Clive, 1900.)

IN general character this book resembles those already available for students of elementary hygiene and public health. It is intended more particularly for students receiving lessons upon the lines of the syllabus of the Department of Science and Art, now the Board of Education, but it may also be used by other students. The order of treatment differs from that usually adopted, but it may be doubted whether in some cases the change is an improvement. A noteworthy point, however, is that, so far as possible, the physiological facts required to intelligently consider hygienic principles are dealt with as they are required, instead of being described in a separate section devoted to physiology. Another characteristic of the book is that simple experiments illustrating the points described are given at the ends of some of the chapters. There is still room for a book containing not only lecture experiments, but a good course of laboratory work to be done by individual students of hygiene.

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LETTERS TO THE EDITOR.

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Measurements in Schools. Collateral Heredity.

I AM at present engaged on an investigation into the strength of collateral heredity, *i.e.* the degree of resemblance for a variety of mental and physical characters of pairs of brothers, pairs of sisters, and pairs of brothers and sisters. In this matter I cannot seek the aid of parents, for they are scarcely unbiased observers, but I have to appeal for aid to those who teach in schools, and have thus an independent and often extensive knowledge of their pupils' characters. This is very frequently combined with the scientific training and caution which renders the teacher's aid of special value. As it is necessary to obtain measurements and observations of both sexes, I have appealed to both men and women teachers, and as it is also needful to combine the sexes (in the brother-sister measurements) to those working in elementary schools, as well as in boys' public schools and in girls' high schools. The result of my appeal has been to bring me a great deal of most valuable aid. Several high schools have been dealt with, four of our chief public schools have been, or are being measured, and a considerable variety of private, elementary and other schools. But a single public school (even of 500 to 700 boys) will often have only ten to twenty pairs of brethren, not, perhaps, as many as in a village national school, and I am most desirous of getting further help. The determination of the strength of collateral heredity is a problem of great scientific importance, and it can only be achieved by co-operative action. I have found so many teachers in all classes of schools willing to give disinterested aid in the cause of science that I venture to make a further appeal through NATURE for more assistance. Besides observations of physical and mental characters, which can be recorded without measurement, my data papers ask for certain head-measurements, which can, following the printed instructions, be taken quite easily. I shall be most glad to send sample papers to any one willing to assist, and if, after considering these, they find themselves able to assist, say by filling in data papers for ten or more pairs of brothers or sisters, I will at once despatch a head-spanner, of which I have several at the present time, free. The head-spanner should not be retained (unless under special circumstances) for more than a few weeks. Where the school is a small one, one master has, as a rule, filled in the papers entirely; in larger schools, one of the science masters, or even the medical officer, has done the head-measurements, and the other data have been provided by house, form or consulting masters. In the ultimate publication of the statistics all aid will be duly acknowledged, but I make the appeal for help simply on the ground that the investigation of heredity is to-day one of the most important scientific problems, and that its exact quantitative determination is well within the reach of co-operative observation.

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The Perseid Meteoric Shower.

IN the years from 1893 to 1899 inclusive, about 120 determinations of the Perseid radiant were made. With the exception of three or four positions, the dates of the observations ranged from August 1 to 16, while the majority were for August 10 and 11 only.

It seems of little use to continue accumulating observations of the radiant point on and near the date of its maximum. What we essentially require are observations of the earlier stages of the shower during the last half of July, and as the present year offers a good prospect for obtaining them, I trust observers will make a special effort in this direction. The moon will reach her last quarter on July 19, and will prove a very slight hindrance to observation during the ensuing fortnight. When the sky is clear it should be watched all night, the paths of such meteors as are visible carefully recorded, and the results for each date kept separate, so that the place of the Perseid radiant may be traced in its diurnal motion of about 1° to the E.N.E. Some really good determinations of the radiant in July would be valuable, for very few have ever been made owing to the